Precision Agriculture Concept: Distribution Pattern of Selected Soil and Crop Characteristics Influenced by Fertigation

ABSTRACT

The main objective of this research was to determine spatial and temporal variability in a sugar beet filed affected by fertigation by sprinklers to develop a management strategy based on spatial and temporal variability of soil properties and sugar beet performance. The Location of the study area was in Isfahan Province, Iran. To describe the variability of soil and plant status, response to N fertilizer application by sprinklers was studied by analyzing 5 soil elements including N, K, CEC, EC and OM at two times (before and after fertigation) as well as 4 crop properties including tuber moisture content, tuber weight, number of tubers per square meter and tuber sugar content. Results were used to produce spatial and temporal variability maps. Data analysis and map visualization indicate that the higher moisture content causes heavier tuber but the grid which has more number of tubers has the lighter tubers. On the other hand, more tubers with lighter weight have higher sugar content. Matrix correlation of soil and plant properties shows a positive correlation of N in the soil to tuber weight, and tuber moisture while it has a negative correlation to sugar content and number of tubers. Higher sugar content of tubers was achieved compared to previous records of this field and the average of tuber sugar content for the Isfahan province. Fertigation by sprinkler irrigation is beneficial for the high and uniform tuber sugar content (as the economical elements in sugar beet production) of sugar beet in the irrigated area.

Keyword: Precision farming, Spatial and temporal variability, Soil Properties, Sprinkler irrigation